

Appl. No. : 10/697,401
Filed : October 29, 2003

AMENDMENTS TO THE SPECIFICATION

Amend paragraph 1 as follows:

--This application incorporates by reference the entire disclosure of U.S. Patent **Application Serial No. 10/331,444 6,709,267**, entitled "SUBSTRATE HOLDER WITH DEEP ANNULAR GROOVE TO PREVENT EDGE HEAT LOSS[[,]]." filed ~~December 22, 2002.~~ --

Amend paragraph 23 as follows:

--Figure 3E is a cross-sectional view ~~taken of an of the substrate holder 200~~ along the line 3E-3E in Figure 3D;--

Amend paragraph 26 as follows:

--Figure 5B is a schematic cross-sectional view, taken along line ~~5B-5B 6B-6B~~ in Figure 5A, of a portion of a substrate holder according to the embodiment of the present invention shown in Figure 5A;--

Amend paragraph 38 as follows:

--U.S. Patent **Application Serial No. 09/747,173 6,634,882**, which is incorporated by reference, discloses a substrate holder designed to minimize problems associated with substrate "slide," "stick," and "curl." Slide occurs when the substrate is dropped onto the substrate holder from above. Slide is normally caused by a cushion of gas above the holder (e.g., in a recess or pocket sized to receive a substrate) that is unable to escape fast enough to allow the substrate to fall immediately onto the holder. The substrate floats momentarily above the holder as the gas slowly escapes, causing the substrate to slide off center. Conversely, stick is the tendency of the substrate holder to cling to the substrate when the substrate is picked up from the substrate holder. Stick occurs because gas is slow to flow into the small space between the substrate and the holder, creating a vacuum effect between the substrate and the holder. Curl refers to warping of the substrate caused by a combination of both radial and axial temperature gradients therein. Typically, when a substrate is initially inserted into a heated reaction chamber and held above a substrate holder, the center of the substrate is heated disproportionately from below, causing the substrate to curl slightly into a "bowl" or concave-up shape. When the slightly curled substrate is

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dropped onto a hot wafer holder that does not conform in shape to the substrate (e.g., a flat holder), the curl can be greatly exacerbated. Slide and curl often lead to non-uniformities in processed substrates, and stick can cause particle contamination in the reaction chamber.--

Amend Paragraph 39 as follows:

--The substrate holder disclosed in U.S. Patent ~~Application Serial~~ No. 09/747,173 6,634,882 substantially prevents substrate slide and stick by providing a plurality of intersecting grooves underneath the substrate, which permit the flow of gas to and from the region between the substrate and the holder. The embodiments of the present invention discussed below and shown in Figures 3A-E and 5 represent further modifications of the substrate holder of U.S. Patent ~~Application Serial~~ No. 09/747,173 6,634,882.--

Amend Paragraph 40 as follows:

--Figures 3A-E show a substrate holder 200 according to a preferred embodiment. The holder 200, preferably a susceptor capable of absorbing and re-radiating radiant energy, has features similar to the holder disclosed in U.S. Patent ~~Application Serial~~ No. 09/747,173 6,634,882. The holder 200 is preferably circular and made of graphite coated with silicon carbide, although the skilled artisan will appreciate that other materials are also suitable. The substrate holder 200 has a thickness t_h defined as the distance between upper and lower surfaces.--

Amend Paragraph 55 as follows:

--On a bottom surface 210, the substrate holder 200 has a bottom groove 208 centered about a central vertical axis of the substrate holder 200. The bottom groove 208 is configured to receive upper ends of the substrate holder supporters or arms 25 of the spider 22 (Figure 2). Figure 4, which shows a bottom plan view of the holder 200, illustrates a preferred configuration of the bottom groove 208. The illustrated bottom groove 208 comprises a single groove and does not form a complete circle but is interrupted by a section 114, shown on the right side of Figure 4. The interrupting section 114 ensures that the spider 22 cannot rotate independently of the substrate holder 200 once it has locked in position against section 114. A more detailed description of a bottom groove such as bottom groove 208 is provided in U.S. Patent

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Application Serial No. 09/747,173 6,634,882. In an alternative embodiment, the substrate holder does not have a bottom groove. Instead, the holder has a plurality of recesses, each configured to closely receive one of the upper ends of the substrate holder supporters 25 of the spider 22. The skilled artisan will appreciate that there are alternative methods of centering the substrate holder to the holder support.--